

CONCERNING THE *PLEBEJUS ICARIOIDES* RASSENKREIS
(Lepidoptera: Lycaenidæ)

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The western part of North America, due to its diverse topography and climatic conditions,¹ is a region of many barriers to animal migration. Because of this a species (*Rassenkreis*) may develop several races geographically close together. This necessitates, in working out a scheme of geographical variation, a knowledge of the exact type locality of each "species" or race previously described. As is well known, this was an insignificant part of early-day writings due to a different concept of the species, in consequence of which there is still some doubt as to the correct interpretation of names proposed. The names must be applied to those races which best fulfill the author's description and type locality, and, if the type specimen can be positively identified, must agree with the type. However, when a description can apply to specimens of more than one race, when the type (if such ever existed) is lost, and when no exact locality is given, the only course possible is to place that name as a synonym of the original name applied to the *Rassenkreis* without regard to race.

The *Rassenkreis*, *Plebejus icarioides* (Bdv.), occupies the entire continent of North America west of the Central Great Plains region. In this area it has developed numerous divergent races, some more differentiated than others. Some variation, no doubt, is directly caused by climatic conditions under which the butterflies live. Most races follow rather closely the life-zone areas on the western exposures of the mountain ranges whilst in arid regions, races seem to have little to do with altitude. However, before real distributional work can be done much more information must be gained and collections with better data made.

PLEBEJUS ICARIOIDES ICARIOIDES (Bdv.)

Lycæna icarioides Bdv. 1852. Ann. Soc. Ent. Fr., 21:297.

Boisduval (1869) states that Lorquin collected his Californian material somewhere between San Francisco and the moun-

¹ Authors consistently use this as a basis for genetic differentiation, as if differing climatic conditions by its direct effect genetically changes the heredity of an organism. The inheritance of acquired characters is, of course, not accepted.

tains to the east and in northern California. He mentions the placer mining areas in the "Juba" mountains which are the foothills of the central Sierra Nevada. In the description of this particular species he states that the specimens are from the mountains. At the time Lorquin was in California the only areas open in the mountains were these "Juba" mining areas and the Truckee and Placerville roads to Lake Tahoe and Nevada. Specimens collected today between 2000 and 4000 feet elevation (between Transition and Upper Sonoran life-zones) along either of these roads or in the "Juba" mountains agree with the report given of the type by McDunnough (1914) as well as a report he has communicated to me. Specimens from higher elevations show the tendency toward the orange margins on the upper side of the wings mentioned by McDunnough as being present on several specimens (females) examined. Other specimens mentioned by him as having the black spots on the under side nearly obsolete are more typical of those which fly at higher elevations and approach the Nevada race *ardea* Edws. Although unfortunately I have been unable to refer to the figure of the type (more exactly a cotype) shown by Oberthür nor to the types said to be in the U. S. National Museum, because of the convincing information of the type locality and the agreement of the description with specimens taken at that locality, I place the type locality of the race *icarioides* (Bdv.) as : 2000-4000 feet El Dorado and Nevada counties, California. It is to be noted that Lorquin might very well have collected specimens of the race *ardea* (Edws.) (those in which the spots are nearly obsolete) ; all of which Boisduval classed as his types.

PLEBEJUS ICARIOIDES PARDALIS (Behr)

Lycæna pardalis Behr 1867. Proc. Calif. Acad. Nat. Sci., 3:279

The description of this race being in Latin is rather short but to the point. The male is blue and the female entirely brown. It is figured in Holland (1931) and Comstock (1927) as *mari-copa* Reakirt. The types were destroyed in the San Francisco fire of 1906 and no figures of them exist. The type locality, however, makes its identity undoubted. Behr (1867) writes, "The only habitat of this species yet known to me is in the Contra Costa Coast Range, in the vicinity of San Antonio, where it frequents steep, grassy hillsides". The Contra Costa Coast Range

is a name used in the early days of California for the Berkeley and Oakland hills facing San Francisco on the west (Contra Costa means "on the other side", that is, on the other side of the bay from San Francisco). San Antonio is the name of a very early settlement situated just to the south of San Antonio Creek (now Lawe Merritt) in the center of the present city of Oakland. The hills to the east are those referred to, now covered by the city. Typical specimens may still be obtained a few miles to the south in the Redwood Peak region or to the north in the Berkeley hills. Barnes and McDunnough's (1916) figure of a specimen from Sonoma County seems typical but is north of the type locality. For the interpretation of Behr's geographical locations I am indebted to Prof. Edwin C. Van Dyke of the University of California.

PLEBEJUS MARICOPA (Reakirt)

Lycæna maricopa Reakirt 1866. Proc. Acad. Nat. Sci. Phil. 1866:245.

Reakirt's description is very important. The first paragraph follows: "Male. Upper side brown, glossed with violet blue, a narrow terminal line along the outer margins; a black discal bar on the primaries, sometimes wanting, and some obsolete rounded spots on the hind margin of the secondaries. Fringe ash colored." Also part of the second paragraph: ". . . three transverse maculate bands; the first composed of eight large rounded black spots, . . .". From this I deduce the following:

1. The description is of a female as none of the *Plebejinæ* are known with males brown on the upper side.

2. ". . . a black discal bar on the primaries, sometimes wanting" could only mean that he had more than one specimen to draw his description from and possibly more than one race. Also in the last sentence of the second paragraph of his description he says, ". . . and the seventh spot of the first and second rows are sometimes confluent." Obviously he was describing a variable series of specimens.

3. The "type" specimen in the Strecker collection does not have any blue or violet-blue gloss or suffusion on its upper surface (Barnes and McDunnough 1916) and therefore, although it may have been in Reakirt's series of specimens, because of its

disagreement with the description and for other reasons as stated by Barnes and McDunnough it cannot be designated the type.

4. The type locality "California" is of little value except that a study of Reakirt's travels in the state might enlighten the subject. He is supposed to have collected from the vicinity of Los Angeles through the Sierra Nevada foothills (at that time busy with mining activities) to Sacramento (Essig 1931). However, there is some doubt as to whether he collected in the state at all. In the Tehachapi (Comstock 1927) he might have obtained the specimen now in the Strecker collection. Here also he might have gotten the name *maricopa* from the town by that name in Kern County.

5. Therefore, as no valid type exists, as no type locality is known, and as the description is too poor to adequately place the name other than as some form of *icarioides* with large spots (of which several exist), the name *maricopa* Reakirt must be considered a synonym of *icarioides* Bdv. and *pardalis* Behr must be removed from the synonymy of *maricopa*.²

Plebejus icarioides missionensis Hovanitz, new race

Size identical with *P. pheres* (Bdv.).³ Upper surface of wings: Male, identical with *pheres*; blue with black border and white fringes; anal angle and body clothed with white hair. Female, identical with *pheres* except for the slightly greater restriction of the blue towards the base of the wings; marginal row of black or slightly blue spots at lower end of outer margin of secondaries. Under side: Male and female almost identical; ground color of a darker shade than in *pheres*; two rows of black spots on both primaries and secondaries, those on primaries much the same as in *pheres* but outer row darker; secondaries differing from *pheres* in having inner row of spots round, black and encircled with white; outer row smaller and not encircled with white.

Missionensis differs from *pheres* (Bdv.) in having black instead of white spots on the under side secondaries, from *pardalis*

²In weighing evidence for the correct interpretation of names, I place of greatest importance locality and secondly description. Evidence of a type specimen I give due consideration. The reasons for this I believe are obvious: Type specimens may be mislabelled or mixed, etc., descriptions are not always accurate and may have been drawn from a few atypical specimens of the race.

³This combination, I believe, is new in print. *Plebejus icarioides pheres* (Bdv.).

(Behr) in having smaller black spots and with a blue suffusion in the female, from *icarioides* (Bdv.) in having greater hairiness of the body and wings, in the different shade of blue and in its smaller average size, and from *moroensis* Sternitzky in having larger black spots on the under side of secondaries. No genetical study has yet been made of these races.

Holotype ♂ (No. 4526, C.A.S., Ent.) Twin Peaks, San Francisco, Calif. Elevation 700 ft. April 10, 1934. Collected by the author. Placed in the collection of the Calif. Acad. Sci. *Allotype* ♀ (No. 4527, C.A.S. Ent.). Same locality, date and disposition made. *Paratypes*. None designated but the author will furnish determined topotypicals.

We have found that the type locality of *P. icarioides* (Bdv.) is the central Sierra Nevada foothills of approximately 3000-4000 feet elevation. This, therefore, restricts the above name to that certain montane race of the Rassenkreis. The same author named another butterfly *pheres*, which differed by having white spots on the secondaries instead of black, and which was taken in San Francisco. Also in San Francisco is found a race differing from both of these and which apparently does not have a name. This I have described above as *Plebejus icarioides missionensis* Hovanitz.

P. i. pheres (Bdv.) is found on the sand-dunes of western San Francisco on, or in relation with, the larval food-plant, *Lupinus chamissonis* Esch. No other locality is known. *P. i. missionensis* Hovanitz flies in a different but contiguous area to the east, being abundant on the Twin Peaks and Mission District hills of the city, in areas where *Lupinus variicolor* Steud. is found. It thus occupies a region between *pheres* and *pardalis* but cannot be considered a transition or intergrade. All these races agree with Jordan's Law in that they occur in different but adjacent areas; and, it is also of interest to note that the larval food plant, and climatic conditions of each are different. The writer realizes that because of lack of definite knowledge of intergradation, some authors might wish these to remain as separate species; however, whether one wishes to call them species or subspecies, they are at least different races and for matter of convenience the trinomial had better be used. Because of the differing current usage of the terms species and subspecies, the author be-

lieves the following two old terms deserve greater use in designating these concepts: 1. *Race* to be used for the only taxonomic category recognizable in nature; this is identical with what has been called the subspecies. 2. *Rassenkreis* to designate the connected series of races which by some is called the species. Both of these are old terms whose meanings have not become warped. The former is known to all. The latter is finding much greater use in America of late although it has been used in Europe (Germany) for some time. The species-subspecies terminology implies that the species is a definite category from which various geographical variants (subspecies) have arisen and which by isolation in space and time will become species. Any subspecies must intergrade with some other subspecies or it is elevated to specific rank. The *Rassenkreis* (racial circle) terminology does not imply any origin of a species for this still seems to be a debatable question. It is merely a connected series of related races, many of which may be isolated so that intergradation can not take place and does not imply that races are incipient species (*Rassenkreis*). However, some writers go so far as to say that the *Rassenkreis* is definite in nature and that racial variation occurs only within this unit. Two other terms have sometimes been used, *complex* and *exerge*; the former referring to a closely related group of races and, in many cases, obviously meaning a *Rassenkreis*, and the latter referring to a geographical branch of a racial circle produced by straight-line migration. Use of the former should be avoided as it has no definite meaning but the latter (*exerge*) is a good term to use in describing geographical distribution.

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